

REMARKS

Claims 2-25 are pending in the above-identified application. Claims 2, 8, and 12 are amended. No new subject matter is added. It is respectfully submitted that this Amendment is fully responsive to the Office Action dated June 29, 2005.

Claims 2-7, 12-14, 16, 17 19, 20 22, 23 and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Applicant's admitted prior art (hereinafter "APA") in view of *Tonegawa et al.* (USPAPN 2003/0155657 A1, hereinafter "*Tonegawa*"). Claims 2 and 8 are amended.

In the Office Action, the Examiner acknowledged that the APA does not disclose performing plasma processing using a hydrogen-containing gas on side surfaces of the interlayer dielectric film, the side surfaces being exposed to the hole. The Examiner asserted that *Tonegawa* discloses this missing feature and concluded that a person of ordinary skill would be motivated to modify APA with *Tonegawa* to obtain better adhesion. Applicants respectfully disagree for at least the following reasons.

The plasma treatment performed in *Tonegawa* is for improving a bonding strength and achieving an adhesion improving effect (pars. [0067] – [00681].) Also, the plasma treatment is performed to the etching stopper film 7 and the like as shown in Figs. 8C, 12B, 14C, 18C and 21A. This treatment cannot prevent side etching of the interlayer dielectric film during making an opening in the SiC barrier film (the etching stopper film). Accordingly, even if one were to combine the teachings of the APA and *Tonegawa*, the resultant combination would not be the claimed invention.

Conventionally, when SiC film 103 is etched, the porous silica film 104 is processed by side etching, resulting in receding side portions of the porous silica [p. 2.] One object of the present invention is to prevent side etching of an interlayer dielectric film when a trench is formed [p. 3.] To accomplish this objective, the present application teaches performing hydrogen plasma processing to form a modified layer 4a by modifying the exposed portions of the porous silica film. *Tonegawa* and the APA fail to recognize either the problem or the solution. Instead, *Tonegawa* teaches performing a plasma treatment to improve adhesion of the low dielectric film and the barrier metal in order to prevent the occurrence of separation of the barrier metal and scratches. Therefore, although *Tonegawa* does appear to disclose a plasma treatment process, it is for an entirely different function and purpose.

In addition, Figs 4A & 4B show that plasma treatment is applied to the MSQ surface 18 (i.e., second interlayer insulation film) in order to improve the bonding strength between surface 18 and the barrier metal 4 [paragraphs 67-68.] Therefore, it is clear that the plasma treatment process described in *Tonegawa* is not performed on a side surface of the interlayer dielectric film (that is exposed to the hole) [claim 1.]

Accordingly, Applicants respectfully request that the Examiner withdraw the obviousness rejection of claims 2-7, 12-14, 16, 17 19, 20 22, 23 and 25.

Claims 8-11, 15, 18, 21 and 24 were also rejected under 35 U.S.C. §103(a) as being unpatentable over APA in view of *Tonegawa*, as applied above, and further in view of *Ryuzaki et al.* (USPN 6,777,325). Claim 8 is amended. For the reasons stated above, the cited references

Amendment Under 37 C.F.R. §1.111
Serial No. 10/784,821
Attorney Docket No. 042139

fail to teach or suggest *performing plasma processing on side surfaces of the interlayer dielectric film*. Accordingly, Applicants respectfully request that the Examiner withdraw the obviousness rejection of claims 8-11, 15, 18, 21 and 24.

For at least the foregoing reasons, the claimed invention distinguishes over the cited art and defines patentable subject matter. Favorable reconsideration is earnestly solicited.

Should the Examiner deem that any further action by applicant would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone applicant's undersigned attorney.

If this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



Darrin A. Auito
Attorney for Applicant
Registration No. 56,024
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

DAA/meu